Future developments at the Sector 5 macromolecular crystallography facility: An experimental and theoretical investigation of current beamline performance and the projected benefits of the ongoing major optics upgrade.

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The Beamline 5 protein crystallography facility has served as a premier center for solving protein structures since its inception over 5 years ago. However, the push towards tackling ever larger and more complex problems in macromolecular biology is placing ever increasing demands on all aspects of current beamline performance. Hence, a thorough theoretical and experimental investigation has now been launched to identify, evaluate and prioritize potential major upgrades to the existing beamline optics. The results of this study identify a number of opportunities for significantly enhancing the current beamline performance and also reveal important lessons for beamline designers and beamline scientists in other disciplines of synchrotron radiation research.